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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/016,685

12/17/2001

Young-ran Song

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21171

7590

06/25/2004

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EXAMINER

MARTINEZ, JOSEPH P


ART UNIT

PAPER NUMBER

2873

DATE MAILED: 06/25/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/016,685	SONG ET AL.	
	Examiner	Art Unit	
	Joseph P. Martinez	2873	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 March 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-57 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 9-34 and 44-56 is/are allowed.
- 6) ☒ Claim(s) 1-6, 35-43 and 57 is/are rejected.
- 7) ☒ Claim(s) 7-8 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 December 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>3-17-04, 4-20-04</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-3, 35-37, 41-43 and 57 are rejected under 35 U.S.C. 102(b) as being fully anticipated by Jachimowicz et al. (5224198).

Re claim 1, '198 teaches for example in fig. 1, a wearable display system having a display panel to output at least one signal, comprising: at least one waveguide (20) to guide a propagation of the at least one signal output from the at least one display panel (22); a plurality of gratings (23, 28) to diffract the at least one signal propagating through the at least one waveguide; and at least one magnifying lens (25) to magnify the at least one signal diffracted by at least one of the plurality of gratings (23, wherein the office interprets the diffractive lens to inherently include a diffraction grating in a concentric pattern, as is well known in the art).

Re claim 35, '198 teaches for example in fig. 7, a wearable display system having a monocular structure, comprising: a waveguide (72) through which a signal propagates; a display panel (71) placed on the waveguide, the display panel to output the signal; a first grating (75, wherein the office interprets the diffractive lens to inherently include a diffraction grating in a

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concentric pattern, as is well known in the art) to diffract the signal output from the display panel and incident upon the first grating at a predetermined incidence angle (wherein the office interprets the incidence angle to be 45 degrees), at a predetermined diffraction angle (wherein the office interprets the diffraction angle to be 45 degrees) in a first direction of the waveguide; a second grating (76 or 77, wherein the office interprets the diffractive lens to inherently include a diffraction grating in a concentric pattern, as is well known in the art) to diffract the signal propagating through the waveguide and incident upon the second grating (wherein the office interprets the incidence angle to be 45 degrees) at the predetermined diffraction angle at the first grating, at the predetermined incidence angle at the first grating; and magnifying lens (76 or 77, col. 4, ln. 64-67) to magnify the signal diffracted by the second grating.

Re claim 57, '198 teaches for example in fig. 7, a wearable display system having at least one display panel (71) to output at least one signal, comprising: at least one waveguide (72) to guide a propagation of the at least one signal output from the display panel; at least one first grating (75, wherein the office interprets the diffractive lens to inherently include a diffraction grating in a concentric pattern, as is well known in the art) to diffract the at least one signal propagating through the at least one waveguide; at least one second grating (76 or 77, wherein the office interprets the diffractive lens to inherently include a diffraction grating in a concentric pattern, as is well known in the art) to diffract the at least one signal propagating through the waveguide and incident upon the at least one second grating, toward eyes of a user; and at least one magnifying lens (76 or 77, col. 4, ln. 64-67) to magnify the at least one signal diffracted by the at least one second grating.

Re claim 2, '198 further teaches for example in fig. 1, the plurality of gratings comprises: at least one first grating (23) to diffract the at least one signal output from the at least one display panel (22) so that the at least one signal propagates through the at least one waveguide (20), and at least one second grating (28) to diffract the at least one signal propagating through the at least one waveguide and diffracted by the at least one first grating.

Re claim 3, '198 further teaches for example in fig. 7, at least one first grating (75) to reflect the at least one signal output from the at least one display panel (71) and incident on the at least one first grating at a predetermined incidence angle (wherein the office interprets the incidence angle to be 45 degrees), at a predetermined reflection angle (wherein the office interprets the reflection angle to be 45 degrees); and at least one second grating (76) to reflect the at least one signal propagating through the waveguide and incident (wherein the office interprets the incidence angle to be 45 degrees) upon the at least one second grating at the predetermined reflection angle at the at least one first grating, at the predetermined incidence angle at the at least one first grating.

Re claims 36 and 37, '198 further teaches for example in fig. 7, the second grating is placed on a same surface (77) or on an opposite side (76) of the waveguide as the first grating.

Re claim 41, '198 further teaches for example in fig. 7, the first grating (75) is positioned opposite to the display panel (71) in the waveguide (72) and is a reflection type grating to reflect the signal output from the display panel and incident upon the first grating (wherein the office interprets the incidence angle to be 45 degrees) at the predetermined incidence angle, at the predetermined reflection angle in the first direction within the waveguide.

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Re claim 42, '198 further teaches for example in fig. 7, the second grating (78) is a transmission type grating to transmit the signal propagating through the waveguide and incident upon the second grating (wherein the office interprets the incidence angle to be 45 degrees) at the predetermined reflection angle at the first grating, at the predetermined incidence angle at the first grating.

Re claim 43, '198 further teaches for example in fig. 7, the second grating (76) is a reflection type grating to reflect the signal propagating through the waveguide and incident upon the second grating (wherein the office interprets the angle of incidence to be 45 degrees) at the predetermined reflection angle at the first grating, at the predetermined incidence angle at the first grating.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 4-6 and 38-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jachimowicz et al. (5224198).

Re claim 4, '198 teaches for example, the wearable display system as disclosed above in fig. 1.

But, fig. 1 of '198 fails to explicitly teach at least one first grating to transmit the at least one signal output from the at least one display panel and incident on the at least one first grating at a predetermined incidence angle, at a predetermined transmission angle to propagate the output signal through the at least one waveguide, and at least one second grating to transmit the at least one signal propagating through the at least one waveguide and incident upon the at least one second grating at the predetermined transmission angle at the at least one first grating, at the predetermined incidence angle at the at least one first grating.

However, '198 teaches for example in fig. 6, at least one first grating (63, col. 4, ln. 17-19) to transmit the at least one signal output from the at least one display panel (61) and incident on the at least one first grating at a predetermined incidence angle (wherein the office interprets the incidence angle to be perpendicular), at a predetermined transmission angle (wherein the office interprets the transmission angle to be 45 degrees) to propagate the output signal through the at least one waveguide (62), and at least one second grating (69) to transmit the at least one signal propagating through the at least one waveguide and incident upon the at least one second grating at the predetermined transmission angle (wherein the office interprets the incidence angle to be 45 degrees) at the at least one first grating, at the predetermined incidence angle at the at least one first grating and further suggests, in col. 6, ln. 20-22, that "any single embodiment can incorporate any or all of the described features."

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the embodiments of '198 in order to have at least one first grating to transmit the at least one signal output from the at least one display panel and incident on the at least one first grating at a predetermined incidence angle, at a predetermined

transmission angle to propagate the output signal through the at least one waveguide, and at least one second grating to transmit the at least one signal propagating through the at least one waveguide and incident upon the at least one second grating at the predetermined transmission angle at the at least one first grating, at the predetermined incidence angle at the at least one first grating in order to tailor the apparatus to provide a predetermined amount of magnification without reducing the eye relief (col. 6, ln. 29-31).

Re claim 5, '198 teaches for example, the wearable display system as disclosed above in fig. 1.

But, fig. 1 of '198 fails to explicitly teach at least one first grating to reflect the at least one signal output from the at least one display panel and incident on the at least one first grating at a predetermined incidence angle, at a predetermined reflection angle; and at least one second grating to transmit the at least one signal propagating through the at least one waveguide and incident upon the at least one second grating at the predetermined reflection angle at the at least one first grating, at the predetermined incidence angle at the at least one first grating.

However, '198 teaches for example in fig. 6, at least one first grating (67) to reflect the at least one signal output from the at least one display panel (61) and incident on the at least one first grating at a predetermined incidence angle (wherein the office interprets the incidence angle to be 45 degrees), at a predetermined reflection angle (wherein the office interprets the reflection angle to be 45 degrees); and at least one second grating (69) to transmit the at least one signal propagating through the at least one waveguide (62) and incident upon the at least one second grating (wherein the office interprets the incidence angle to be 45 degrees) at the predetermined

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reflection angle at the at least one first grating, at the predetermined incidence angle at the at least one first grating and further suggests, in col. 6, ln. 20-22, that “any single embodiment can incorporate any or all of the described features.”

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the embodiments of ‘198 in order to have at least one first grating to reflect the at least one signal output from the at least one display panel and incident on the at least one first grating at a predetermined incidence angle, at a predetermined reflection angle; and at least one second grating to transmit the at least one signal propagating through the at least one waveguide and incident upon the at least one second grating at the predetermined reflection angle at the at least one first grating, at the predetermined incidence angle at the at least one first grating in order to tailor the apparatus to provide a predetermined amount of magnification without reducing the eye relief (col. 6, ln. 29-31).

Re claim 6, ‘198 teaches for example, the wearable display system as disclosed above in fig. 1.

But, fig. 1 of ‘198 fails to explicitly teach at least one first grating to transmit the at least one signal output from the at least one display panel and incident upon the at least one first grating at a predetermined incidence angle, at a predetermined transmission angle, and at least one second grating to reflect the at least one signal propagating through the at least one waveguide and incident upon the at least one second grating at the predetermined transmission angle at the at least one first grating, at the predetermined incidence angle at the at least one first grating.

However, '198 teaches for example in fig. 6, at least one first grating (63) to transmit the at least one signal output from the at least one display panel (61) and incident upon the at least one first grating at a predetermined incidence angle (wherein the office interprets the incidence angle to be perpendicular), at a predetermined transmission angle (wherein the office interprets the transmission angle to be 45 degrees), and at least one second grating (67) to reflect the at least one signal propagating through the at least one waveguide (62) and incident upon the at least one second grating at the predetermined transmission angle at the at least one first grating (wherein the office interprets the incidence angle to be 45 degrees), at the predetermined incidence angle at the at least one first grating and further suggests, in col. 6, ln. 20-22, that "any single embodiment can incorporate any or all of the described features."

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the embodiments of '198 in order to have at least one first grating to transmit the at least one signal output from the at least one display panel and incident upon the at least one first grating at a predetermined incidence angle, at a predetermined transmission angle, and at least one second grating to reflect the at least one signal propagating through the at least one waveguide and incident upon the at least one second grating at the predetermined transmission angle at the at least one first grating, at the predetermined incidence angle at the at least one first grating in order to tailor the apparatus to provide a predetermined amount of magnification without reducing the eye relief (col. 6, ln. 29-31).

Re claim 38, '198 teaches for example, the wearable display system as disclosed above in fig. 7.

But, fig. 7 of '198 fails to explicitly teach the first grating is located adjacent to the display panel, and the first grating is a transmission type grating to transmit the signal output from the display panel and incident upon the first grating at the predetermined incidence angle, either in the first or second direction within the waveguide at a predetermined transmission angle.

However, '198 teaches for example in fig. 6, the first grating (63) is located adjacent to the display panel (61), and the first grating is a transmission type grating to transmit the signal output from the display panel and incident upon the first grating at the predetermined incidence angle (wherein the office interprets the incidence angle to be perpendicular), in the first direction within the waveguide at a predetermined transmission angle (wherein the office interprets the transmission angle to be 45 degrees) and further suggests, in col. 6, ln. 20-22, that "any single embodiment can incorporate any or all of the described features."

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the embodiments of '198 in order to have the first grating is located adjacent to the display panel, and the first grating is a transmission type grating to transmit the signal output from the display panel and incident upon the first grating at the predetermined incidence angle, either in the first or second direction within the waveguide at a predetermined transmission angle in order to tailor the apparatus to provide a predetermined amount of magnification without reducing the eye relief (col. 6, ln. 29-31).

Re claim 39, '198 teaches for example, the wearable display system as disclosed above in fig. 7.

But, fig. 7 of '198 fails to explicitly teach the second grating is a reflection type grating to reflect the signal propagating through the waveguide and incident upon the second grating at the predetermined transmission angle at the first grating, at the predetermined incidence angle at the first grating.

However, '198 teaches for example in fig. 6, the second grating (67) is a reflection type grating to reflect the signal propagating through the waveguide and incident upon the second grating (wherein the office interprets the incidence angle to be 45 degrees) at the predetermined transmission angle at the first grating, at the predetermined incidence angle at the first grating and further suggests, in col. 6, ln. 20-22, that "any single embodiment can incorporate any or all of the described features."

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the embodiments of '198 in order to have the second grating is a reflection type grating to reflect the signal propagating through the waveguide and incident upon the second grating at the predetermined transmission angle at the first grating, at the predetermined incidence angle at the first grating in order to tailor the apparatus to provide a predetermined amount of magnification without reducing the eye relief (col. 6, ln. 29-31).

Re claim 40, '198 teaches for example, the wearable display system as disclosed above in fig. 7.

But, fig. 7 of '198 fails to explicitly teach the second grating is a transmission type grating to transmit the signal propagating through the waveguide and incident upon the second

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grating at the predetermined transmission angle at the first grating, at the predetermined incidence angle at the first grating.

However, '198 teaches for example in fig. 6, the second grating (69) is a transmission type grating to transmit the signal propagating through the waveguide and incident upon the second grating (wherein the office interprets the incidence angle to be 45 degrees) at the predetermined transmission angle at the first grating, at the predetermined incidence angle at the first grating and further suggests, in col. 6, ln. 20-22, that "any single embodiment can incorporate any or all of the described features."

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the embodiments of '198 in order to have the second grating is a transmission type grating to transmit the signal propagating through the waveguide and incident upon the second grating at the predetermined transmission angle at the first grating, at the predetermined incidence angle at the first grating in order to tailor the apparatus to provide a predetermined amount of magnification without reducing the eye relief (col. 6, ln. 29-31).

Allowable Subject Matter

Claims 7-8 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Specifically regarding claim 7, wherein the claimed invention comprises a wearable display system comprising a waveguide, display panel, a plurality of gratings for diffraction,

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magnifying lens and specifically, at least one shutter to alternately block a plurality of the signals output by the display panel in the waveguide, to produce a three-dimensional image, as claimed.

Specifically regarding claim 8, wherein the claimed invention comprises a wearable display system comprising a waveguide, display panel, a plurality of gratings for diffraction, magnifying lens and specifically, wherein at least one magnifying lens is moveable along a predetermined length of at least one waveguide, as claimed.

Claims 9-34 and 44-56 are allowed.

The following is an examiner's statement of reasons for allowance: the prior art taken alone or in combination fails to anticipate or fairly suggest the limitations of the claims, in such a manner that a rejection under 35 USC 102 or 103 would be proper. The prior art fails to teach a combination of all the claimed features as presented in dependent claims 7 and 8 and independent claims 9, 20, 44, 50 and 56.

Specifically regarding claim 9, wherein the claimed invention comprises a wearable display system having a binocular structure comprising a first grating for diffraction, a plurality of second gratings for diffraction, a plurality of magnifying lenses, and specifically, a display panel at the center of the waveguide, as claimed.

Specifically regarding claims 20 and 44, wherein the claimed invention comprises a wearable display system having a binocular structure comprising a waveguide, two first gratings for diffraction, second gratings for diffraction, magnifying lenses, and specifically, two display panels respectively placed on opposite sides of the waveguide, as claimed.

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Specifically regarding claim 50, wherein the claimed invention comprises a wearable display system having a monocular structure comprising a waveguide, display panel, first grating for diffraction, second grating for diffraction, magnifying lens and specifically, the second grating is oriented perpendicular to the first grating in the waveguide, as claimed.

Specifically regarding claim 56, wherein the claimed invention comprises a wearable display system comprising a waveguide, display panel, a plurality of gratings for diffraction, magnifying lens and specifically, wherein the signal propagates to left and right eyes of a user with a time difference, thereby producing a three-dimensional image.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Response to Arguments

Applicant's arguments with respect to claims 1-6, 35-43 and 57 have been considered but are moot in view of the new ground(s) of rejection.

Applicant's arguments, see p. 18-19, filed 3-19-04, with respect to claims 7-34 and 44-56 have been fully considered and are persuasive. The rejection of claims 9-34 and 44-56 has been withdrawn.

Conclusion

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joseph P. Martinez whose telephone number is 571-272-2335. The examiner can normally be reached on M-F 7:00 AM to 3:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Georgia Y. Epps can be reached on 571-272-2328. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JPM
6-16-04



Hung Xuan Ding
Primary Examiner